APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,053	01/18/2002	Santosh C. Lolayekar	MARA-01008US0 SBS	1750

			EXAMINER
28554	7590	06/02/2005	EDELMAN, BRADLEY E

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ART UNIT	PAPER NUMBER
2153	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/051,053	LOLAYEKAR ET AL.
	Examiner	Art Unit
	Bradley Edelman	2153

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2005*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-26* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 8-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

This action is in response to Applicant's amendment and request for continued examination filed on October 28, 2004. Claims 1-6 and 8-26 are presented for further examination.

Claim Objections

1. Claim 11 is objected to because of the following informalities: line 14 appears to be missing a word – the phrase "receiving a plurality of storage input/output requests *at* least one port" appears to be missing a word. Perhaps the last part of the phrase should read "at at least one port." Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 23-26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

In considering claim 23, the claim recites a "machine readable media which has instructions stored thereon" and then recites that the instructions "when executed... perform [various steps]." The specification does not describe what is meant by a "machine readable media." Nonetheless, a "machine-readable medium" as broadly construed, it could include a piece of paper with a computer program written on it. As so claimed the computer program does not define any structural and functional

interrelationships between the "machine readable medium" and the claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed "computer-readable medium" encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory." Examiner therefore recommends changing the wording of the preamble to read something like "a computer-readable medium encoded with a computer program, which when executed...."

Claims 24-26 depend from claim 23 and are thus rejected for the same reasons.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 11-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In considering claim 11, the terms "the initiator" on lines 15, 17, and 20 of the claim lack sufficient antecedent basis and are thus ambiguous. It appears that the terms should describe whether the initiator is the "first" or "second" initiator.

Claims 12-14 depend from claim 11 and are thus rejected for the same reasons.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3, and 4 are rejected under 35 U.S.C. 102(a) as being anticipated by

Molero et al. ("On the Switch Architecture for Fibre Channel Storage Area

Networks," June 2001, hereinafter "Molero").

In considering claim 1, Molero discloses a method for use in a system for storing

and accessing data ("SAN"), the system including at least one initiator ("source") and at

least one target comprising a mirrored virtual target or a physical storage device

("destination," which is a storage device – i.e. "disk" – in the Molero system) and at least

one switch ("switch"), the initiator, target, and switch communicating using at least one

network ("SAN"), the at least one switch including a plurality of ports ("ports") and

respective processing circuitry affiliated with each respective port (inherent on the

ports), the method comprising:

Providing a plurality of request paths over the network to the target from switch,

each path passing through at least one port of the switch ("selecting an output link,"

wherein an "output port" is used to connect to one of the target disks over the network

as shown in Fig. 2 and described on p. 486);

Receiving at said at least one port, a plurality of storage input/output requests (§ 3.2 describes that I/O requests between a server initiator and a storage device target pass through the switch); and

For each request at each port, dynamically load balancing each request among the paths by using respective processing circuitry affiliated with each respective port to determine the appropriate path ("destination disk of each I/O operation initiated by a server is randomly chosen among all the disks in the network," § 3.2).

In considering claim 3, Molero further discloses that the target is a physical storage device ("storage device," see § 1).

In considering claim 4, Molero further discloses that the target is a virtual target (the software receiving the communication at the storage device is a "virtual" target).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2, 5, 6, 8-10, and 15-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molero, in view of Jindal et al. (U.S. Patent No. 6,324,580,

hereinafter "Jindal"), and further in view of Ito et al. (U.S. Patent No. 5,721,904,

hereinafter "Ito").

In considering claim 2, the system taught by Molero discloses dynamically load

balancing to select the paths, but does describe that the load balancing is based on a

path having the shortest average response time (instead, Molero describes distributing

the load via a "random" scheme – see § 3.2). Nonetheless, in a similar art, Jindal

discloses a load balancing method for balancing load among mirrored target storage

systems ("servers"), including determining a response time for each path, and passing a

request received by the load balancer from an initiator to a target along the path with the

shortest response time (col. 5, lines 26-63; col. 6, lines 37-40, "the selected policy

requires choosing the least-loaded server (e.g., that which has the fastest response

time)"). Given the teaching of Jindal, a person having ordinary skill in the art would

have readily recognized the desirability and advantages of including the load balancing

scheme taught by Jindal in the system taught by Molero, because using the path with

the shortest response time will ensure a faster response and reduce the delay for

requests. Thus, it would have been obvious to use the shortest response time load

balancing method taught by Jindal to balance the load between the target storage disks

in the system taught by Molero.

Note that the combined system of Jindal and Molero does not disclose

measuring a shortest *average* response time, as claimed. Nonetheless, using a

shortest average response time to determine which target to select in a load balancing

system is well known, as evidenced by Ito (col. 18, lines 30-36, "the selection operation

by one or both of the methods based on response time is executed a plurality of times [so] that the server component having the shortest average response time is selected"). Given this teaching, it would have been obvious to a person having ordinary skill in the art to load balance in the system taught by Jindal and Molero according to a shortest *average* response time, as taught by Ito, to "[prevent] the effect of change in temporary network traffic congestion" (see Ito, col. 18, lines 34-36).

In considering claim 5, claim 5 includes the same limitation as claim 2, and adds that the target is a mirrored target with a plurality of members. Molero further discloses that the target is a mirrored target with a plurality of members (i.e. one of four disks - § 3.1).

In considering claim 6, Molero further discloses that the request can be a read request ("read operations," § 3.2, ¶ 1).

In considering claim 8, claim 8 contains no further limitations over claims 1 and 2 combined, except that the target is a storage device. Nonetheless, the array of mirrored disks taught by Molero can be considered a storage device. Thus, claim 8 is rejected for the same reasons as claims 1 and 2 combined.

In considering claim 9, claim 9 contains no further limitations over claims 1 and 2 combined, except that the target is a mirrored virtual target having a plurality of

members. Nonetheless, the array of mirrored disks taught by Molero constitutes a mirrored virtual target having a plurality of members. Thus, claim 8 is rejected for the same reasons as claims 1 and 2 combined.

In considering claim 10, Molero further discloses that the request can be a read request ("read operations," § 3.2, ¶ 1).

In considering claim 15, describes a switch that includes similar limitations as claims 1 and 2 combined. Therefore, claim 15 is rejected for the same reasons as claims 1 and 2 combined.

In considering claim 16, the load balancing circuitry will necessarily include a storage processor and CPU.

In considering claim 17, claim 17 contains no further limitations over claim 15 and is rejected for the same reason.

In considering claim 18, Jindal further discloses means for maintaining statistics for the response time of each path (col. 6, lines 15-18, "collect, assemble and analyze the various pieces information") and means for passing a request received by the switch from the initiator to the target along the path with the shortest response time ((col. 5,

lines 26-63; col. 6, lines 47-40, "the selected policy requires choosing the least-loaded

server (e.g., that which has the fastest response time)")

Note that the combined system of Jindal and Molero, as described earlier, does

not disclose measuring a shortest *average* response time, as claimed. Nonetheless,

using a shortest average response time to determine which server to select in a load

balancing system is well known, as evidenced by Ito (col. 18, lines 30-36, "the selection

operation by one or both of the methods based on response time is executed a plurality

of times [so] that the server component having the shortest average response time is

selected"). Given this teaching, it would have been obvious to a person having

ordinary skill in the art to load balance in the system taught by Jindal and Molero

according to a shortest *average* response time, as taught by Ito, to "[prevent] the effect

of change in temporary network traffic congestion" (see Ito, col. 18, lines 34-36).

In considering claim 19, claim 19 describes a storage network that includes the

no further substantive features over the features described in claims 1 and 2 combined,

and is thus rejected for the same reasons.

In considering claim 20, Molero further discloses that the target is a physical

storage device ("storage device," see § 1).

In considering claim 21, Molero further discloses that the target is a virtual target

(the software receiving the communication at the storage device is a "virtual" target).

In considering claim 22, Molero further discloses that the target is a mirrored target with a plurality of members ("disks") wherein the plurality of paths are respective paths to each member (i.e. each member is connected to a different port of the switch).

In considering claim 23, claim 23 describes a machine readable media for performing the same functions as claims 1 and 2 combined, and is thus rejected for the same reasons.

In considering claim 24, Molero further discloses that the target is a physical storage device ("storage device," see § 1).

In considering claim 25, Molero further discloses that the target is a virtual target (the software receiving the communication at the storage device is a "virtual" target).

In considering claim 26, claim 26 presents the same substantive steps as claim 2, and is thus rejected for the same reasons as discussed with regard to claims 1 and 2.

Response to Arguments

In considering Applicant's request for reconsideration filed on March 17, 2005, the following factual remarks are noted.

a.   Molero and Bhaskaran do not anticipate a method calling for providing a plurality

of request paths over the network to the target from the switch, each path passing

through at least one port of the switch, and receiving at said at least one port, a plurality

of input/output requests.

b.   Ito does not teach processing storage input/output requests, as claimed.

In considering (a), Applicant contends that Molero and Bhaskaran do not

anticipate a method calling for providing a plurality of request paths over the network to

the target from the switch, each path passing through at least one port of the switch,

and receiving at said at least one port, a plurality of input/output requests. More

particularly, Applicant argues that neither Molero nor Bhaskaran disclose *storage*

input/output requests. Examiner has withdrawn the rejections over Bhaskaran so that

reference is moot. However, Examiner respectfully disagrees with Applicant's argument

regarding Molero. Molero explicitly discloses that the requests are to a storage system

and are I/O requests. See p. 484, col. 2, describing its use for a storage area network;

see also p. 486, ¶ 3.2, describing I/O requests. Applicant has attempted to distinguish

the claim language, which requires a storage i/o "request" from Molero, which,

according to Applicant, describes routing only at the packet level. Examiner respectfully

disagrees with this argument. Notably, Molero describes routing entire i/o operations - §

3.2 states "the destination disk for each I/O operation initiated by a server is randomly

chosen." Thus, the I/O operations taught by Molero are I/O storage requests.

In considering (b), Applicant contends that Ito does not teach processing storage input/output requests, as claimed. Examiner agrees, but did not reject the claims in view of Ito alone. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Thus, because the combination of Molero, Jindal, and Ito discloses all of the claim features, the obviousness rejection is maintained.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bradley Edelman whose telephone number is 571-272-3953. The examiner can normally be reached from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glen Burgess can be reached at 571-272-3949. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Bradley Edelman

BE
May 31, 2005